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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/708,525

03/10/2004

Susumu Noda

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2524

29453

7590

06/27/2005

EXAMINER

SONG, SARAH U

JUDGE PATENT FIRM

RIVIERE SHUKUGAWA 3RD FL.

3-1 WAKAMATSU-CHO

NISHINOMIYA-SHI, HYOGO, 662-0035

JAPAN

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/708,525

Applicant(s)

NODA ET AL.

Examiner

Sarah Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,14 and 16 is/are rejected.
- 7) ☒ Claim(s) 3-13,15 and 17 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>0604,1204</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The prior art documents submitted by the applicant in the Information Disclosure Statement filed on June 15, 2004 and December 14, 2004 have all been considered and made of record (note the attached copy of form PTO-1449).

Drawings

3. This application has been filed with three (3) sheets of drawings, which have been approved by the Examiner.

Specification

4. The disclosure is objected to because of the following informalities: Examiner believes that the notation for wavelength throughout the specification was intended to be λ , not " λ ". Similarly, it is believed that the notation of angle " θ " should also be corrected in the abstract, specification and the claims.

Appropriate correction is required.

Claim Objections

5. Claims 1 and 7 are objected to because of the following informalities: It is believed that the notation of angle " θ " should also be corrected. Claims 2-6 and 8-17 inherit the same objection by nature of their dependency. Appropriate correction is required.

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6. Claims 2 and 3 are objected to because of the following informalities: Examiner suggests inserting —are— before “connected” in line 6. Appropriate correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1, 2, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noda et al. (U.S. Patent Application Publication 2002/0009277 cited by Applicant) in view of Terajima (JP 2001-242329 cited by Applicant).**

9. Regarding claim 1, Noda et al. discloses a first 2D photonic crystal including a first waveguide made from a line defect 11 and a first cavity made from a point defect 14, said first cavity acting to take in light of a specific wavelength from said first waveguide and radiate it outside said first photonic crystal and conversely acting to introduce light of a specific wavelength into said first waveguide from outside of said first photonic crystal.

10. Noda et al. does not disclose a second 2D photonic crystal including a second waveguide having substantially the same characteristics as said first waveguide, and a second cavity having substantially the same characteristics as said first cavity, and means for optically connecting said first and second waveguides in series so as to have light in common, and so that when the principal plane of said first 2D photonic crystal and the electric-field vector of the light within said first waveguide form an arbitrary angle α , the principal plane of said second 2D photonic

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crystal and the electric-field vector of the light within said second waveguide form an angle of $\alpha + (\pi/2)$.

11. Terajima discloses an optical device comprising first and second 2D photonic crystals that are connected in series so as to have light in common, and so that when the principal plane of said first 2D photonic crystal and the electric-field vector of the light within said first waveguide form an arbitrary angle α , the principal plane of said second 2D photonic crystal and the electric-field vector of the light within said second waveguide form an angle of $\alpha + (n/2)$.

12. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a second 2D photonic crystal having the same characteristics as the first 2D photonic crystal of Noda et al. and arranged as claimed for the purpose of providing a small-sized optical device capable of high-speed communications as taught by Terajima (see Abstract).

13. Regarding claim 2, said first and second 2D photonic crystals are disposed so that their principal planes are orthogonal to each other; and said first and second waveguides are connected to each other directly in series. Figure 1b of Terajima.

14. Regarding claim 14, Noda et al. discloses 2D photonic crystals containing a plurality of cavities differing from one another in resonant frequency. Paragraph [0062].

15. Regarding claim 16, Noda et al. further discloses a photodetector for detecting light radiated from the cavities. Paragraph [0065].

Allowable Subject Matter

16. Claims 7-13, 15 and 17 would be allowable if rewritten to overcome the objections noted above.

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17. Claims 3-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or reasonably suggest a means for coupling a first and second 2D photonic crystals via a PM fiber as recited in claims 3 and 4, via a Faraday rotator as recited in claim 5, via a half-wave plate as recited in claim 6, via a 50/50 optical coupler optically parallel-connecting said first and second waveguides as recited in claims 7-13, 15 and 17.

Conclusion

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Song whose telephone number is 571-272-2359. The examiner can normally be reached on M-Th 7:30am - 6:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sarah Song
Patent Examiner
Group Art Unit 2874